THE FISHERY FOR ANTARCTIC KRILL (*EUPHAUSIA SUPERBA*)

The catch of Antarctic krill in the Southern Ocean in 1989/90 was 395,470 tonnes. This represents 83% by weight of the total catch of all marine species from Antarctic waters; makes the operation for Antarctic krill the world's largest single-species crustacean fishery; and puts the krill harvest among the world's top 30 fisheries by tonnage (FAO 1989).

Antarctic krill are currently being caught predominantly in the Atlantic sector of the Southern Ocean: the Antarctic Peninsula, South Georgia and the South Orkneys but the area of operation of the krill fleets is likely to expand in the near future. Fish are still being caught in the South Georgia, Antarctic Peninsula and Kerguelen Island regions but catches are low (104,405 tonnes in 1989/90) due to over-fishing. The krill fishery has displayed considerable catch fluctuations but is likely to be the mainstay of the Southern Ocean fishery in the foreseeable future.

Estimates of the stock size of Antarctic krill range between 55 and 7000 million tonnes (Miller and Hampton, 1989). The krill population is circumpolar though certain areas are richer in krill than others. Evidence to date suggests that the krill population is not separated into stocks (Fevolden and Schneppenheim, 1989).

The Soviet Union which has more than 100 large (90m+) freezer trawlers operating in the Southern Ocean accounts for 76% of the krill catch. Japan takes 20% of the krill and Poland, S. Korea and Chile are responsible for the other 4%. Some additional countries may enter the fishery if the economic climate becomes favourable.

Antarctic krill is caught in mid-water trawls and processed on board freezer trawlers. Catches of between 3–10 tonnes per hour are aimed for to ensure product quality and to avoid swamping the processing capacity of the vessel. Areas with catch rates of less than 50 tonnes per day are avoided. Krill spoil rapidly because of active proteolytic enzymes and are unfit for human consumption unless processed within 3 hours of capture. After 8 hours they are unfit for use in animal feed. Over 50% of the krill catch is now used for human consumption. Some of the Japanese catch is frozen whole and some is boiled then frozen. Most of the catch is peeled then frozen. Krill shells are extremely rich in fluoride and this migrates out of the shell and into the flesh on death (Christians and Leinemann, 1980). Whole krill have very high fluoride levels because of this — up to 1800 ppm 4 times the EEC allowable limit for animal feed — so peeling is the best approach to obtain a quality product. The yield of tail meat from krill produced by roller peelers is 10–25% of the wet weight of whole krill (Budzinski *et al.*, 1985). Meal is produced from the excess low-quality krill.

Consideration is being given to processes which can utilise the waste material from the krill fishery. Valuable by-products which could be extracted from krill waste include: carotinoid pigments, chitin, proteolytic enzymes and vitamins. The fishery is currently only marginally economic and the extraction of high value chemicals from krill waste may increase the worth of the krill catch and encourage new entrants to the fishery (Nicol, 1989).

Exploitation of the resources of the Southern Ocean is controlled by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) which meets annually in Hobart, Tasmania. Its 20 members include all the nations involved in fishing in the Southern Ocean and all the Antarctic treaty signatories. CCAMLR first met in 1982 but it was not until the 1989 meeting of CCAMLR that management of the krill fishery made it onto the agenda. Management of the krill fishery is necessary since krill occupy the pivotal role in the Antarctic ecosystem and over-exploitation could have disastrous results. The information required to scientifically manage the krill harvest is not yet available. In the absence of such information it should still be possible to protect krill and their predators by introducing interim catch limits. At present these limits could be set high enough that the fishing nations would have considerable room for expansion yet low enough that the Southern Ocean ecosystem would remain undamaged. Whether krill can be the first successfully managed fishery resource in the Southern Ocean will depend on the negotiations over management plans that take place over the next few years.

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